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17. ABSTRACT (MAX. 250 WORDS)

Briefly outlines research activities conducted under the auspices of the National Merit Scholarship Corporation for the 12-month period July 1962 through June 1963. The research covers the following areas: (1) The identification of talent, (2) the conversation of talent; (3) educational influences; (4) vocational goals; their origins and development; (5) personal development and mental health; and (6) miscellaneous descriptive, methodological, and editorial reports. The report concludes with a 99-item reference list of papers completed between January 1, 1957 and June 30, 1963.

Technical Report No. 6, reporting research activities for the previous year (July 1961 through June 1962), is also on file in the *Clearinghouse*.

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Technical Report No. 7

A Program of Research on the Identification, Motivation, and Training of Talented Students

National Merit Scholarship Corporation

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education

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The aims, methods, and preliminary results of research being conducted under the auspices of the National Merit Scholarship Corporation and financed by the National Science Foundation, the Carnegie Corporation of New York, the Ford Foundation, and NMSC, have been summarized in earlier technical reports (94, 95, 96, 97, 98, 99). The present report outlines research activities for the twelve-month period, July, 1962, through June, 1963. Our staff has also written two brief reports which give nontechnical accounts of our research (60, 69). The present report is intended primarily for an audience of educators, psychologists, and sociologists.

Our research goals are, first, to obtain information which will be of practical value in the operation of scholarship and financial aid programs, and second, to acquire knowledge which will be of general value in understanding the nature of talent and its development. More specifically, our research program covers the following areas: (1) The Identification of Talent, (2) The Conservation of Talent, (3) Educational Influences, (4) Vocational Goals: Their Origins and Development, (5) Personal Development and Mental Health, and (6) Miscellaneous Descriptive, Methodological, and Editorial Reports.

I. The Identification of Talent

Our goals in this area are to find more effective ways of identifying those high school students who will have outstanding achievements in college and in their subsequent vocation. In striving for these relatively immediate practical goals, we hope also to develop a theory of achievement, to stimulate new research, and to communicate what we learn about talent and achievement succinctly and effectively.

Ultimately, such knowledge should increase our ability to identify and educate talented persons.

1. The Prediction of Academic and Extracurricular Achievement in College. A sample of Finalists polled and tested as high school seniors was reassessed for their achievements in the freshman year of college. The predictive variables include a group of potential achievement and high school achievement scales, the Vocational Preference Inventory (VPI), and a variety of other scales and indexes: Indecision Scale, Range of Experience, Intellectual Resources in the Home, Range of Competencies, the Deferred Gratification Scale, Super Ego Scale, etc. The criteria of accomplishment included achievement in the following areas: leadership, science, dramatic arts, literature, music, art, and college grades.

Multiple regression equations were developed by selecting the most efficient predictors from the 130 predictors tried. Three to five variable multiple prediction equations for each criterion and for each sex were obtained. Eleven of the 14 multiple regression formulas were found to be significant upon cross- validation; the multiple r's ranged from .12 to .44 and average .31. The cross-validation of the Potential and High School Achievement Scales was more successful. The correlations for the Potential scales on the cross-validation samples range from .19 to .64 and average .37; the r's for the High School Achievement scales range from .16 to .70 and average .38.

These results suggest that we can predict freshman achievement with simple scales as well as we can with the best combinations of a variety of more elaborate and expensive predictors. The principal findings are consistent with a substantial literature which reveals that past performance predicts future performance and that a student's achievement is positively associated with his interests, goals, and self-conceptions. (17, Completed)

2. The Prediction of Post College Achievement and Status (1956 Assessment). In this predictive study, which covers a six-year interval, the first group of Merit

Scholars and Finalists was polled in 1962 for information about their educational and vocational achievements. Their achievements will be related to information obtained about them in the 1956 assessment, made when they were high school seniors. (In progress)

3. The Prediction of Achievement, Stability in Field, and Personal Stability (1959, 1960 assessments). Students in the 1959 and 1960 assessments were polled again at the end of their sophomore and junior years in college to discover their achievements, educational plans, perceptions of college, and personal stability. This information will be correlated with assessment data obtained when the students were high school seniors. (In progress)

4. Undergraduate Achievement, College Choice, Personal Development, and Vocational Plans (1962). A sample of National Merit participants was sent a single booklet which incorporated the most useful devices and scales from all previous assessments. This booklet was designed primarily to predict achievement (artistic, academic, literary, oral, musical, and social), although it also contained materials for other studies. This assessment, together with appropriate follow-up studies, will make possible a series of studies of achievement, vocational choice, choice of college, and personal development. Equally important, it will provide a way to study the interactions between particular students and colleges. (In progress)

5. Experimental Scholarships. Beginning in 1961, NMSC gave experimental scholarships to students in four categories: those who showed unusual creative promise; those who were outstanding in a single academic field; those who had taken less than four years to complete high school; and those who had unusually good academic records in spite of severe financial and social disadvantages.

The group of students selected for experimental scholarships in 1961 and a second group selected in 1962 were assessed with the same materials sent to Finalists in those years. Thus it will be possible to compare the undergraduate records

of achievement, creativity, leadership, and stability of the students holding experimental scholarships with those of Finalists selected by other methods and for other purposes. (In progress)

6. The Prediction of the First-Year College Performance of High Aptitude Students (1960 Assessment). The academic achievement and extracurricular achievements in science, art, writing, dramatics, music and leadership during the first year in college were predicted from measures of aptitude, originality, self-conception, aspiration, personality, interest, home background and child rearing attitudes of the parents. The various measures of achievement had quite low correlations with each other, and, in general, were related to different predictors. In this high ability sample the best cateogry of predictors was high school achievements. This category was followed closely by measures of interest and by personality inventory scales. (21, Completed)

7. Socioeconomic Factors in the Achievements and Aspirations of the Merit Scholar. The 334 Merit Scholars among our sample of 127,212 freshmen entering college in 1961 were compared with the nonscholars. Scholars tended to come from higher socioeconomic backgrounds, to achieve more frequently in both academic and creative fields, and to have more ambitious educational plans. Scholars are also more likely than other students to be interested in careers as college professors or scientific researchers, and less likely to be interested in school teaching, business, and the professions. Additional comparisons using samples of matched subjects demonstrated that these differences between Scholars and nonscholars cannot be attributed to the Scholars' more affluent socioeconomic backgrounds. (5, Completed)

II. Conservation of Talent

Our goals in this series of studies are to learn the extent of talent loss, to determine the effects of scholarships and special recognition, and to acquire some

much-needed knowledge about educational motivation. At present we are concerned with talent loss within college; we have already investigated many other aspects of the problem of conservation of talent (see earlier technical reports).

8. Personal and Environmental Factors Associated with College Drop-Outs Among High Aptitude Students. Dropping out of college among high aptitude students is negatively related to rank in high school class, highest degree initially sought, number of scholarships applied for, educational level of both parents, father's occupational level, and number of peers who attended college. Personality inventories indicate that drop-outs, as compared with students who remain in college, tend to be more self-centered, flexible, assertive, and aloof, and to be more concerned with personal pleasure. Male drop-outs tend to give intropersonal explanations for leaving college (e.g., indecision, personal problems), whereas female drop-outs tend to give external reasons (e.g., marriage, money). Females appear to be more likely to drop out if they attend a college with a relatively high proportion of males in the student body. No differential college effects were observed on dropping out among male students. (3, Completed)

III. Educational Influences

This section summarizes our studies of the college itself. Our goals are to find ways of characterizing colleges, and to learn if colleges affect the student's achievement, vocational and educational plans, and personal development.

9. Differential College Effects on Student Achievement. Criteria of first-year college achievement in leadership, science, dramatic arts, literature, music, and art were predicted from extensive data available before the student entered college. Residual achievement scores, independent of the initial status of the student, will be calculated and correlated with various characteristics of the college the student was attending. These analyses will yield information about the role of the college environment in student extracurricular achievement. (In progress)

10. Differential College Effects on the Motivation of Talented Students to Obtain the Ph.D. An input-output design for controlling differential student input was applied in a four-year longitudinal study of 6,544 students from the 1957 program. Ph.D. aspiration was negatively affected by the size of the student body, the percentage of males in the student body, and the Conventional Orientation. Attending a coeducational liberal arts college appears to increase the student's motivation to seek the Ph.D., whereas Ph.D. aspiration tends to be reduced among those who attend one of the northeastern men's colleges. (2, Completed)

11. Undergraduate Institutions and Production of Scientists. The effects of different college characteristics on the student's motivation to pursue a career in science were examined in a four-year longitudinal study of Semifinalists and Commended Students from the 1957 program. The male student's motivation to pursue a career in science was positively influenced by attendance at a technological institution or a coeducational liberal arts college. The female student's motivation to pursue a career in science was negatively affected by the affluence of the institution attended. (8, Completed)

12. A Study of Institutional Characteristics Related to College Productivity. An extended summary of college studies completed under a two-year grant from the National Science Foundation (July 1, 1960 through June 30, 1962). (1, Completed)

13. Some Characteristics of Student Bodies Entering Higher Educational Institutions. This is the first of several studies based on information obtained from the entire entering freshman class at each of 248 institutions in Fall, 1961. Data from these 127,212 students were reduced to a set of 52 freshman "input" variables for each institution. A factor analysis of these 52 variables, in which the institution was used as the sampling unit, identified six major distinguishing characteristics of entering freshman classes: Intellectualism, Estheticism, Status, Leadership, Masculinity, and Pragmatism. (6, Completed)

14. The Distribution of Students Among Higher Educational Institutions. High correlations were found between characteristics of the college and characteristics of its entering student body (see previous study). Pronounced differences were also found in the freshman input at various types of institutions. In general, private nonsectarian institutions tend to recruit student bodies with greater potential for achievement than any other type of institution. (7, Completed)

15. Who Goes Where to College? A monograph report of the freshman input study is being prepared. One additional question being explored is the extent to which the freshman input factors can be predicted from available data about colleges. (In progress)

16. College Effects on Four Types of Career Choice. Four types of career choices--Realistic, Intellectual, Social, and Enterprising--will serve as the dependent variables in a four-year longitudinal study of 4,000 male students from the 1957 program. One hypothesis to be tested is that a given type of career choice (e.g. Enterprising) is facilitated by the parallel EAT variable (e.g. Enterprising Orientation) in the college environment. (In progress)

17. Objective Studies of the College Environment. Data on the college environment have now been collected from approximately 125 students at each of 246 institutions. Studies of the 400 items of information which are available on each of the 30,000 students will be done separately on observable student behaviors, the classroom environment, the geographic environment, and subjective impressions of the environment. (In progress)

18. Studies of the Environments of Graduate and Professional Schools. Questionnaires will be sent to about 6,500 students from the 1957 program, most of whom will be starting their third year in graduate or professional school. Items will be designed to identify some of the salient features of the environments of graduate and professional schools. (In progress)

19. The Effects of Various College Characteristics on Student Aptitude Test Scores. A sample of 356 National Merit Finalists attending 91 colleges was used to assess the effects of colleges on student Graduate Record Examination performance. Pre-college characteristics of the students were controlled by multiple partial correlation and by modifications of this technique. Colleges tended to influence the verbal and quantitative scores of the students in opposite directions. Northeastern men's colleges tended to increase verbal relative to quantitative while technical institutes and state universities tended to increase quantitative relative to verbal. The students' major field of study had a similar reciprocal effect on the verbal and quantitative scores, but most of the differences between colleges remained when the effect of major field of study was controlled. The size of the college effects was small relative to the variability attributable to differences between students which existed before the students entered college. (19, Completed)

IV. Personal Development

Last year we started to study personal stability, mental illness, and related developmental problems. We hope to learn how the student's personality is changed by his college experiences, and what sorts of life experiences are conducive to personal stability, effectiveness, etc.

20. Twin Study. Data on the ability, achievements, interests, attitudes, personality, and early life development are being obtained from a large group of twins. These data will make possible a study of the genetic and environmental factors which affect ability, achievement, and personality. (In progress)

21. Life Goals and Vocational Choice. Factor analyses of 56 life-goal and self-rating items were performed on separate samples of 250 male and 250 female students. Seven identifiable factors were replicated in the two analyses. Two factors (Self-Esteem and Scholarship) were associated with self-ratings; three

other factors (Personal Comfort, Prestige, and Altruism) with life goals, and the remaining two (Artistic Motivation and Science-Technology) with both self-ratings and life goals. Analyses of four factor scores using 5,495 students in 36 groups of career fields revealed great differences in life goals as a function of career choice. (10, Completed)

22. 1962 Personal Development. A group of 1962 Merit Finalists and normative students were assessed with an extensive questionnaire covering attitudes, interests, and current personality and behavior. Reports of early life experiences were obtained from the parents and ratings were obtained from teachers and peers. These data have been prepared for analysis and will serve as initial measures for a longitudinal study of personal development during the college years. (In progress)

23. Differential College Effects on Student Personality. National Merit Finalists were assessed before entry into college with the Holland Vocational Preference Inventory, the 16 Personality Factor Questionnaire and ten a priori personality inventory scales. These tests were repeated four years later as the students graduated from college. Residual final scores will be calculated which are independent of the initial student characteristics. These residuals will be factored to obtain information about the dimensions of personality change and they will be correlated with the characteristics of the college the student attended to obtain information about the effects of various college characteristics. (In progress)

24. The Parental Attitudes of Mothers of Intelligent Adolescents and the Creativity of their Children. The child-rearing attitudes of the mothers of 796 male and 450 female Merit Finalists were assessed with the Parental Attitude Research Instrument which was scored for three factors: Authoritarian-Control, Hostility-Rejection, and Democratic Attitudes. The children of these mothers were assessed with a variety of inventory scales, self-ratings, interest and activity check lists, high school performance measures and teacher ratings. All of the student measures

were correlated with the mother's attitude factors. Only the Authoritarian Control factor had correlates exceeding chance expectancy. Authoritarian child rearing attitudes of the mother were negatively related to measures of the creativity and originality of the child, but were positively related to academic performance. (20, Completed)

25. Longitudinal Studies with the California Psychological Inventory and the Inventory of Beliefs. 700 Finalists from the 1957 program were retested with the CPI and IB (about five and one half years later) in early 1963. The effects of differential environmental experience on personality will be studied with these data. (In progress)

V. Vocational Goals: Their Origins and Development in the High School and College Years

This group of studies is intended to discover the ways in which the student selects vocational goals, the personal and impersonal origins of his choice, the collegiate experiences which affect his goals, and the nature of his career after college. We hope also to develop a theory of vocational goals which will organize this knowledge. Studies of post-college vocational achievement will be integrated with the identification studies.

The studies so far completed stem largely from two previous reports: the rationale of an inventory of occupational titles developed to measure personality, and a theory of vocational choice. The ideas in these preliminary reports have led to a series of studies of vocational preference, choice of occupation and major field, and the relation of the student's vocational goals to his aptitudes, personality, potential for creativity, self-evaluation, his parents' values and attitudes, etc.

26. The Psychology of Vocational Preference and Choice. This address outlines the theory of vocational choice used in this series of studies, reviews the

principal results, and indicates some implications for new research and practical application. (13, Completed).

27. Explorations of a Theory of Vocational Choice: III. A Longitudinal Study of Change in Major Field of Study. Change in major field plans for a one-year period (high school senior year to end of freshman year in college) were studied by assessing a sample of students in high school with interest, personality, originality, self-ratings, achievement and aptitude measures. Students were re-assessed in college and pre- and post-college freshman year plans were compared. Remaining in a given field appears to be associated with having personal attributes commonly associated with the typical student while leaving a field is related to dissimilarity between a student's attributes and those of the typical student. (16, Completed)

28. Explorations of a Theory of Vocational Choice: IV. Vocational Preferences and Their Relation to Occupational Images, Daydreams, and Personality. Some general hypotheses from a theory of vocational choice were tested in an assessment of a sample of high aptitude students. In accordance with the theory, vocational preferences were found generally to be associated with self-descriptions, coping behavior, and daydreams about images of vocations.

For example, students with scientific interests characterize themselves in accordance with our stereotype of the scientist. Further, their images of the scientist are similar to their self-characterizations on an adjective checklist. The way in which a student with scientific interests copes with the problems of living also appears somewhat consistent with our knowledge of the scientist. Similar findings were obtained for other occupational groups. (14, Completed)

29. Explorations of a Theory of Vocational Choice: V-VI. These studies are near completion. They continue the study of how students make vocational choices. (In progress)

30. The Development and Validation of an Indecision Scale: The Natural History of a Problem in Basic Research. A 15 item Indecision Scale was empirically derived to understand the process of decision. The Indecision Scale was found to have substantial construct validity by virtue of its relationship with personality and interest inventories, self-ratings and life goals, and various achievements. When the Indecision Scale was applied to a cross-validation sample, it was also found to have predictive validity over a one-year interval for change in major field. Results lend support to decision theory emphasizing the importance of personality and interest variables. The Indecision Scale is also positively associated with both the potential for and performance of creative work, especially in the arts. (18, Completed)

31. The Psychology of Vocational Behavior. A small book which summarizes some of the evidence about vocational choice and which is a more explicit and comprehensive account of the theory proposed earlier. (In progress)

VI. Miscellaneous Methodological, Descriptive, and Editorial Reports and Book Reviews

Our chief emphasis is on studies central to the main objectives of the Corporation and the research program--for instance, the identification of talent, college environments, and talent loss. But whenever practicable, we will continue to study various special problems, since such studies provide information about talented youth which is of general scientific and educational interest.

32. Professional Views of Some Recent Protests Against Psychological Testing: Some Specific Allegations--How Damaging? This paper is a critical review of some of Banesh Hoffmann's criticisms of objective testing. (4, Completed)

33. "Eggheads, Athletes, and Hard Workers." A review of A. H. Tannenbaum's book, Adolescent Attitudes Toward Academic Brilliance. (9, Completed)

34. "A Little Learning is . . ." A review of two recent books on testing: by Banesh Hoffmann, The Tyranny of Testing and by Martin Gross, The Brainwatchers. (12, Completed)

35. "Comment" on article by Gonyea. (11, Completed)

Research Staff

The following persons were employed on the research staff during the period covered in this report:

Name	Title	Period of Employment	Per cent of time
John L. Holland	Director of Research	7-1-62 - 6-30-63	100
Alexander W. Astin	Research Associate	7-1-62 - 6-30-63	100
Robert C. Nichols	Research Associate	7-1-62 - 6-30-63	100
Virginia O. Chalmers	Secretary	7-1-62 - 6-30-63	100
Nora Kirchner	"	8-17-62 - 6-30-63	100
Leslie Urquhart	"	3-11-63 - 6-30-63	100
Catherine J. Brant	"	7-1-62 - 8-31-62	100
Hope M. Krupnick	"	7-1-62 - 4-30-63	100
Karen R. Schwarm	"	2-4-63 - 3-15-63	100
Harriet J. Clark	Research Assistant	7-16-62 - 6-30-63	40
Mary A. Salmon	" "	9-10-62 - 6-30-63	75
Joann C. Schmalenberger	" "	9-13-62 - 6-13-63	50
Annette G. Ahlmann	" "	7-1-62 - 9-15-62	421-1/2 hrs.
Barbara L. Barliant	" "	6-10-63 - 6-30-63	105 "
Linda J. Brule	" "	7-1-62 - 7-6-62	20 "
Hazel E. Clifford	" "	7-16-62 - 8-31-62	258-1/2 "
Jerald Clark	" "	12-18-62 - 2-1-63	119 "
Phyllis R. Fisher	" "	7-1-62 - 6-30-63	457 "
Alma R. Hendrich	" "	7-1-62 - 6-30-63	244-1/4 "
Hsio H. Hsia	" "	6-18-63 - 6-30-63	28-1/2 "
Suzanne L. Krantz	" "	7-1-62 - 8-15-62	147-1/4 "
Florence Jerome	" "	11-6-62 - 6-30-63	231 "
Elaine L. Miller	" "	9-13-62 - 11-2-62	114-3/4 "
Sandra S. Read	" "	1-14-63 - 2-15-63	63-3/4 "
Anita J. Templer	" "	9-24-62 - 6-30-63	378-1/4

References for Papers Completed during the Period

July 1, 1962 through June 30, 1963

1. Astin, A. W. A study of institutional characteristics related to college productivity. Evanston, Ill.: National Merit Scholarship Corp., 1962.*

2. ------. Differential college effects on the motivation of talented students to obtain the Ph.D. J. educ. Psychol., 1963, 54, 63-71.

3. ------. Personal and environmental factors associated with college drop-outs among high aptitude students. Evanston, Ill.: National Merit Scholarship Corp., 1963.*

4. ------. Professional views of some recent protests against psychological testing: Some specific allegations--how damaging? Psychol. Sch., in press.

5. ------. Socioeconomic factors in the achievements and aspirations of the Merit Scholar. Personnel guid. J., in press.

6. ------. Some characteristics of student bodies entering higher educational institutions. Evanston, Ill.: National Merit Scholarship Corp., 1963.*

7. ------. The distribution of students among higher educational institutions. Evanston, Ill.: National Merit Scholarship Corp., 1963*

8. ------. Undergraduate institutions and production of scientists. Science, in press.

9. ------. Eggheads, athletes and hard workers. Review of A. H. Tannenbaum's Adolescent attitudes toward academic brillance. Contemp. Psychol., in press.

10. ------., & Nichols, R. C. Life goals and vocational choice. J. appl. Psychol., in press.

11. Holland, J. L. "Comment" on article by Gonyea. J. counsel. Psychol., 1963, 10, 26-27.*

12. ------. A little learning is . . . Teachers College Record, 1963, 65, 510-514.*

13. ------. The psychology of vocational preference and choice. Psi Chi Invited Address, Midwest Psychological Association Meetings, 1963.*

14. ------. Explorations of a theory of vocational choice: IV. Vocational preferences and their relation to occupational images, daydreams, and personality. Voc. guid. J., in press.

15. ------. Psychology of vocational behavior. Evanston, Ill.: National Merit Scholarship Corp., 1963. *

16. ------., & Nichols, R. C. Explorations of a theory of vocational choice: III. A longitudinal study of change in major field of study. Evanston, Ill.: National Merit Scholarship Corp., 1963.*

17. ------. The prediction of academic and extracurricular achievement in college. Evanston, Ill.: National Merit Scholarship Corp., 1963.*

18. ------. The development and validation of an indecision scale: the natural history of a problem in basic research. J. counsel. Psychol., in press.

19. Nichols, R. C. The effect of various college characteristics on student aptitude test scores. Evanston, Ill.: National Merit Scholarship Corp., 1963.*

20. ------. The parental attitudes of mothers of intelligent adolescents and the creativity of their children. Evanston, Ill.: National Merit Scholarship Corp., 1963.*

21. ------., & Holland, J. L. Prediction of the first year college performance of high aptitude students. Psychol. Monogr., in press.

22. ------. The selection of high aptitude high school graduates for maximum achievement in college. Personnel guid. J., in press.

References for Reports Completed during the Period January 1, 1957 through June, 1962

23. Astin, A. W. A re-examination of college productivity, J. educ. Psychol., 1961, 52, 173-178.

24. ------. Criterion-centered research. Evanston, Ill.: National Merit Scholarship Corp., 1961. (mimeo)*

25. ------. "Productivity" of undergraduate institutions. Science, 1962, 136, 129-135.

26. ------. "Bad habits" and social deviation: a proposed revision in conflict theory. J. clin. Psychol., 1962, 18, 227-231.

27. ------. A note on the MMPI psychopathic deviate scale. Educ. psychol. Measmt. 1961, 21, 895-897.

28. ------. An empirical characterization of higher educational institutions. J. educ. Psychol., 1962, 53, 224-235.

29. ------. Evaluating the effects of college on the talented student. American Mathematical Monthly, 1962, 69, 802-804.

30. ------. Influences on the student's motivation to seek advanced training: another look. J. educ. Psychol., 1962, 53, 303-309.

31. ------. A note on the relationship between creative and academic achievement. Evanston, Ill.: National Merit Scholarship Corp., 1962. (Mimeo)*

32. ------. Further validation of the Environmental Assessment Technique. J. educ. Psychol., in press.

33. ------., & Holland, J. L. The environmental assessment technique: a way to measure college environments. J. educ. Psychol., 1961, 52, 308-316.

34. ------. The distribution of "wealth" in higher education. College and University, 1962, 37, 113-125.

35. Holland, J. L. Undergraduate origins of American scientists. Science, 1957, 126, 433-437.*

36. ------. Student explanations of college choice and their relation to college popularity, college productivity, and sex differences. College and University, 1958, 33, 313-320.*

37. ------. A note on the reliability and validity of the Minnesota Scale for Parental Occupations as an estimate of family economic status. J. appl. Psychol., 1958, 42, 195-196.*

38. ------. The prediction of scholastic success from a high aptitude sample. School and Society, 1958, 86, 290-293.*

39. ------. A personality inventory employing occupational titles. J. appl. Psychol., 1958, 42, 336-342.*

40. ------. Parental expectations and attitudes about colleges. College and University, 1959, 34, 164-170.*

41. ------. A theory of vocational choice. J. counsel. Psychol., 1959, 6, 35-45.*

42. ------. Determinants of college choice. College and University, 1959, 35, 11-28.

43. ------. A classification for occupations in terms of personality and intelligence. Amer. Psychologist, 1959, 14, 376. (Abstract)*

44. ------. The undergraduate achievement of National Merit Scholars and Certificate of Merit winners. The Bulletin of the National Association of Secondary School Principals, 1959, 43, 190-192.

45. ------. Some limitations of teacher ratings as predictors of creativity. J. ed uc. Psychol., 1959, 50, 219-223.*

46. ------. The prediction of college grades from the California Psychological Inventory and Scholastic Aptitude Test. J. educ. Psychol., 1959, 50, 135-142.*

47. ------. The relation of the Vocational Preference Inventory to the Sixteen Personality Factor Questionnaire. J. appl. Psychol., 1960, 44, 291-296.*

48. ------. National Merit Scholars and the problem of identification. Paper presented at Americal Personnel and Guidance Association meeting, 1959.*

49. ------. The achievement, aptitudes, and personalities of National Merit Scholars and Certificate of Merit winners. The Bulletin of the National Association of Secondary School Principals, 1960, 44, 100-104.

50. ------. The prediction of college grades from personality and aptitude variables. J. educ. Psychol., 1960, 51, 245-254.

51. ------. A comparison of National Merit Scholars and Certificate of Merit winners. The Bulletin of the National Association of Secondary School Principals, 1960, 44, 140-142.

52. ------. Creative and academic performance among talented adolescents. J. educ. Psychol., 1961, 52, 136-147.

53. ------. Research on honors: a response to the MacLeod-Heist proposals. The Superior Student, 1960, 3, 7-8.*

54. ------. Achievement syndromes among high aptitude students. Psychological Reports, 1961, 8, 384.*

55. ------. Dangers in our scholarship policies. Teachers College Record, 1961, 62, 326-328.*

56. ------. Some explorations with occupational titles. J. counsel. Psychol., 1961, 8, 82-87.*

57. ------. Some explorations of a theory of vocational choice: I. One- and two-year longitudinal studies. Psychol. Monogr., 1962, 76 (26, Whole 545)

58. ------. The National Merit research program. Education, 1962, 82, 477-481.* Also appeared in School and Society, 1962, 90, 199-202.*

59. ------. The nature of student achievement: a summary and model for research and practice. In Creativity: its assessment and measurement. Los Angeles: Educational Testing Service, 1962. (Summaries of this paper were presented at meetings of the National Association for the Gifted Child and the Western Regional Conference on Testing Problems, 1962.)*

60. ------. The assessment and prediction of the creative performance of high aptitude youth. Paper presented at the Fourth University of Utah Research Conference on the Identification of Creative Scientific Talent. Salt Lake City, 1962.*

61. ------. Major programs of research on vocational behavior. A chapter for the APGA book, Man in a World of Work, Henry Borow, editor.*

62. ------. The meaning of "interests." Paper presented at APGA Convention, Chicago, 1962.*

63. ------. Explorations of a theory of vocational choice and achievement: II. A four-year prediction study. Psychol. Reports, 1963, 12, 547-594. Southern Univer. Press 1963 Monograph Supplement 4-V12.

64. ------., & Stalnaker, J. M. An honorary scholastic award. J. Higher Educ., 1957, 28, 361-368.

65. ------., & Stalnaker, Ruth C. A descriptive study of talented high school seniors: National Merit Scholars. The Bulletin of the National Association of Secondary School Principals, 1958, 42, 9-21.*

66. ------., & Kent, Laura. The concentration of scholarship funds and its implications for education. College and University, 1960, 35, 471-483.

67. ------., & Astin, A. W. The need for redefining "talent" and "talent loss": a plan for practical action and research. J. Higher Educ., 1962, 33, 77-82.

68. ------. The prediction of academic, artistic, scientific, and social achievement of undergraduates of superior scholastic aptitude. J. educ. Psychol., 1962, 53, 132-143.

69. ------., Astin, A. W., & Nichols, R. C. A research program on talented students. J. College Student Personnel, 1963, 4, 144-150.

70. Nichols, R. C. A comparison of Nationam Merit Finalists with the average student at college graduation. Evanston, Ill.: National Merit Scholarship Corp., 1962. (Mimeo)*

71. ------. Subtle, obvious and stereotype measures of masculinity-femininity. Educ. psychol. Measmt, 1962, 22, 449-461.

72. ------. A factor analysis of parental attitudes of fathers. Child Develpm. 1962, 32, 791-802.*

73. ------., & Davis, J. A. Some characteristics of students of high academic aptitude. Personnel guid. J., in press.

74. ------., & Schnell, R. R. Factor scales for the California Psychological Inventory. J. consult. Psychol., 1963, 27, 228-235.

75. Stalnaker, J. M. Principals evaluate the National Merit Scholarship program. The Bulletin of the National Association of Secondary School Principals, 1958, 42, 22-24.

76. Taylor, C. W., & Holland, J. L. Development and application of tests of creativity. Review of Educational Research, 1962, 32, 91-102.*

77. Thistlethwaite, D. L. Scholarships and the college-going behavior of talented students. College and University, 1958, 34, 65-73.*

78. ------. How the talented student evaluates his high school. School Review, 1958, 66, 164-168.

79. ------. The conservation of intellectual talent. Science, 1958, 128, 822-826.*

80. ------. College scholarship offers and the enrollment of talented students. J. Higher Educ., 1958, 29, 421-425.

81. ------. Counseling high-aptitude students on scholarship opportunities. Personnel guid. J., 1959, 37, 574-577.

82. ------. Merit scholarships and the higher education of gifted students. J. Higher Educ., 1959, 30, 295-304.*

83. ------. Effects of social recognition upon the educational motivation of talented youth. J. educ. Psychol., 1959, 50, 111-116.

84. ------. College environments and the development of talent. Science, 1959, 130, 71 76.*

85. ------. College press and student achievement. J. educ. Psychol., 1959, 50, 183-191.

86. ------. The college environment as a determinant of research potentiality. In C. W. Taylor (ed.) The Third (1959) University of Utah Research Conference on the Identification of Creative Scientific Talent. Salt Lake City: Univer. of Utah Press, 1959, pp. 213-231.*

87. ------. Review of The Gifted Group at Mid-Life by Lewis M. Terman and Melita H. Oden. Science, 1959, 130, 328-329.*

88. ------. The conservation of human talent. Paper presented at the American Personnel and Guidance Association meeting, Cleveland, 1959.*

89. ------. College press and changes in the study plans of talented students. J. educ. Psychol., 1960, 51, 222-234.

90. ------. The recognition of excellence. College and University, 1961, 36, 282-295.

91. ------. Recruitment and retention of talented college students. Paper presented at meetings of the AAAS, New York, December, 1960.*

92. ------. Honors programs and motivation to seek advanced training. The Superior Student, 1961, 4, 16-19.*

93. ------., & Campbell, D. T. Regression-discontinuity analysis--an alternative to the ex post facto experiment. J. educ. Psychol., 1960, 51, 309-317.

94. Technical Report No. 1. National Merit Scholarship Corp., December, 1957.*

95. ------ No. 2. National Merit Scholarship Corp., September, 1958.*

96. ------ No. 3. National Merit Scholarship Corp., June, 1959.*

97. ------ No. 4. National Merit Scholarship Corp., June, 1960.*

98. ------ No. 5. National Merit Scholarship Corp., June, 1961.*

99. ------ No. 6. National Merit Scholarship Corp., June, 1962.

* Reports or reprints not available.

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NATIONAL MERIT SCHOLARSHIP CORPORATION
1580 Sherman Avenue, Evanston, Illinois GReenleaf 5-2552

August 16, 1963

Dear Colleague:

I am enclosing a copy of our seventh Technical Report which we think you will find interesting. If you would like reprints of any of the published studies, write us giving the appropriate reference number from the bibliography.

We would welcome hearing about related research.

Sincerely yours,

John M Stalnaker

John M. Stalnaker
President

Enclosure

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Reported with listing for Technical Report No. 7

Technical Report No. 6

A Program of Research on the Identification, Motivation, and Training of Talented Students

National Merit Scholarship Corporation

The aims, methods, and preliminary results of research being conducted under the auspices of the National Merit Scholarship Corporation and financed by the National Science Foundation, the Carnegie Corporation of New York, and NMSC, have been summarized in earlier technical reports (70, 71, 72, 73, 74). The present report outlines research activities for the twelve-month period, July, 1961, through June, 1962. Our staff has also written two brief reports which give non-technical accounts of our research (11, 15). The present report is intended primarily for an audience of educators, psychologists, and sociologists.

Our research goals are, first, to obtain information which will be of practical value in the operation of scholarship and financial aid programs, and second, to acquire knowledge which will be of general value in understanding the nature of talent and its development. More specifically, our research program covers the following areas: (1) The Identification of Talent, (2) The Conservation of Talent, (3) Educational Influences, (4) Vocational Goals: Their Origins and Development, (5) Personal Development and Mental Health, and (6) Miscellaneous Descriptive, Editorial and Methodological Reports.

Personal Development and Mental Health is a new area of research for us. In August, 1961, Dr. Robert C. Nichols joined our staff to work in this area. An explicit account of his work is given in section IV.

I. The Identification of Talent

Our goals in this area are to find more effective ways of identifying those high school students who will have outstanding achievements in college and in their subsequent vocation. In striving for these relatively immediate practical goals, we hope also to develop a theory of achievement, to stimulate new research, and to

communicate what we learn about talent and achievement succinctly and effectively. Ultimately, such knowledge should increase our ability to identify and educate talented persons.

1. The Nature of Student Achievement: A Model for Research and Practice. (10) This preliminary interpretative statement about the nature of achievement was made in order to help integrate our knowledge of academic, artistic, social, and scientific achievement, to suggest possibilities for new research, and to summarize for educators and laymen the current state of our knowledge. The report contains the following sections: The Nature of Achievement (Academic, Artistic, Social, and Scientific), Model Achievers (formulations which attempt to organize our knowledge about each kind of achievement), and Research and Practical Applications. (Completed)

2. The Characteristics of High Aptitude Students. We have begun a series of studies concerned with differences between National Merit Finalists and normative samples of students. Merit Finalists are selected solely on the basis of a comprehensive achievement test and a scholastic aptitude test. We are concerned with the question: "What sort of person is selected by this process?" Information answering this question will be drawn from four sources: (1) In 1961, the National Opinion Research Center conducted a survey of the career plans of 34,000 college seniors, of whom 1,165 were Merit Finalists. NORC has provided us with this information so that we may compare the Merit Finalists with the students in their normative sample. (2) Project Talent conducted a large-scale testing program which covered about five per cent of all the students enrolled in high school in 1960. They are making available the data on the Merit Finalists in their sample for comparison with their normative sample. (3) A randomly selected sample of college seniors, which was sent materials in the 1958 follow-up study (see p. 12), will constitute a normative group for comparison with the Merit Finalists. (4) A group of students selected at

random from all those taking the NMSQT was sent the materials for the 1962 Personal Development Study (see p. 12). This group will serve as a normative sample for comparison with the Merit Finalists.

Preliminary analyses of some of these data indicate that Merit Finalists come from families of higher socioeconomic status than do normative groups; there is also a higher proportion of males in the Merit Finalist group. More of the Finalists receive honors (e.g., in the NORC sample, 71 per cent were on the Dean's List, nine per cent were Phi Beta Kappa, and 32 per cent graduated with honors). They are more oriented toward academic and research careers; a higher proportion plan to do graduate study. Working with ideas and having the opportunity to be original and creative appeals to them more than to the average student. They are less interested in security and in opportunity for leadership. Preliminary results suggest that none of the above differences can be accounted for by differences in socioeconomic status. (In progress)

3. The Life Goals of Talented Students. The general purpose of this project is to provide a basis for developing criterion measures to assess the adult life performance of the NMSC subjects. A more specific aim is to determine whether or not certain types of goals are more appropriate than others for certain career fields. We believe that a fuller knowledge of the relevance of specific life goals for people in different fields will eventually aid in predicting the student's adult achievement.

1957 Finalists and Commended Students answered items designed to discover their goals in their personal, vocational, and social lives. Preliminary findings suggest that the importance which the student attaches to certain life goals is closely related to his career choice. (In progress)

4. The Prediction of Post-College Achievement and Status (1956 Assessment). In this predictive study, which covers a six-year interval, the first group of

Merit Scholars and Finalists was polled in 1962 for information about their educational and vocational achievements. Their achievements will be related to information obtained about them in the 1956 assessment, made when they were high school seniors. (In progress)

5. The Prediction of Achievement, Stability in Field and Personal Stability (1959, 1960 assessments). Students in the 1959 and 1960 assessments were polled again at the end of their sophomore and junior years in college to discover their achievements, educational plans, perceptions of college, and personal stability. This information will be correlated with assessment data obtained when the students were high school seniors. (In progress)

6. The Prediction of the First-Year College Performance of High Aptitude Students (1960 Assessment). A sample of Finalists polled and tested as high school seniors were reassessed for their achievements in their freshman year of college. In all, 153 predictors (covering background data, the student's attributes, and his parents' attitudes and values) were used. First, these predictors were correlated against 18 criteria of achievement in college. Then, four a priori indexes of potential for achievement were tried out. At present, a third method of prediction is being attempted: multiple regression equations developed in one sample are being applied to a second sample.

The findings in this study are too extensive to summarize completely. Generally, they indicate more efficient ways to predict student achievement. For example, unusual musical accomplishment can be predicted with some success from a simple a priori index of self-ratings and activities. As in past studies, we found that simple measures of activities, interests, goals, and past achievements are typically the best predictors. (In progress)

7. The Prediction of Academic, Artistic, Scientific, and Social Achievement (1961 Assessment). Like previous assessments, the 1961 assessment was planned to

study several related problems: the prediction of academic grades, creative performance in science and art, and leadership. We also continued our explorations of a theory of vocational choice. A sample of Finalists was assessed in 1961 with a wide range of scales and devices planned to predict achievement. This sample was reassessed in 1962 to obtain measures of achievement in the freshman year of college.

A report describing some preliminary results from this assessment (1961) was given at a conference on creativity. A complete report will be available in 1963. (In progress)

8. Undergraduate Achievement, College Choice, Personal Development, and Vocational Plans (1962). A sample of National Merit participants was sent a single booklet which incorporated the most useful devices and scales from all previous assessments. This booklet was designed primarily to predict achievement (artistic, academic, literary, oral, musical, and social), although it also contained materials for other studies. This assessment, together with appropriate follow-up studies, will make possible a series of studies of achievement, vocational choice, choice of college, and personal development. Equally important, it will provide a way to study the interactions between particular students and colleges. (In progress)

9. Experimental Scholarships. Beginning in 1961, NMSC gave experimental scholarships to students in four categories: those who showed unusual creative promise; those who were outstanding in a single academic field; those who had taken less than four years to complete high school; and those who had unusually good academic records in spite of severe financial and social disadvantages.

The group of students selected for experimental scholarships in 1961 and a second group selected in 1962 were assessed with the same materials sent to Finalists in those years. Thus it will be possible to compare the undergraduate records of achievement, creativity, leadership, and stability of the students holding experimental scholarships with those of Finalists selected by other methods and for other purposes. (In progress)

10. A Note on the Relationship between Creative and Academic Achievement. The purpose of this study was to determine if the negligible relationship found between the academic and the creative achievement of students at high levels of aptitude (7) would still be obtained for a broader range of students. Data from a five per cent random sample of 3,745 boys and 2,485 girls from the 1961 survey of entering freshmen were used to test the generality of the earlier findings. In general, the earlier results were confirmed. Grades were found to have low positive relationships (r_{bis} from .10 to .26) with scientific, literary, musical, and oral achievement for both boys and girls. Artistic achievement had no relationship to grades for either sex. (Completed)

11. A Comparison between Merit Scholars and the Average Entering College Freshman. The socioeconomic backgrounds, past achievements, and future plans of Merit Scholars attending the 248 institutions which participated in the 1961 survey of entering freshmen will be compared with those of the other freshmen. One special purpose of this study is to determine to what extent the higher socioeconomic level of the Merit Scholar accounts for the differences between his past achievements and future plans and those of the typical freshman. (In progress)

12. The Selection of High Aptitude High School Graduates for Maximum Achievement. In order to determine what method is most useful for selecting those students whose achievements in college will be outstanding, seven alternative methods of selection were tested. Each of the seven groups consisted of 115 students drawn from a group of 440 Merit Finalists who were among the subjects of the 1960 assessment (see p. 4). Using five criteria of achievement, the seven groups were compared on the basis of their performance during the freshman year. Preliminary results suggest that simple a priori indices based on previous research findings yielded the best selection record. (In progress)

II. Conservation of Talent

Our goals in this series of studies are to learn the extent of talent loss, to determine the effects of scholarships and special recognition, and to acquire some much-needed knowledge about educational motivation. At present we are concerned with talent loss within college; we have already investigated many other aspects of the problem of conservation of talent (see earlier technical reports).

13. Factors Contributing to Talent Loss During the Undergraduate Years. This four-year longitudinal study of the 1957 Finalists and Commended Students is an attempt to identify the personal characteristics and environmental factors which cause the high-aptitude student to terminate his college education prematurely. The relation between the characteristics of the college and the drop-out rate will be studied by means of an input-output design developed earlier for studies of Ph.D. productivity. (In progress)

14. The Characteristics of High School Graduates Who Do Not Attend College. A sample of 3,000 students selected at random from all the students who took the NMSQT in 1961 were asked about their plans for college attendance; volunteers from this group were sent the 1962 Personal Development materials (see p. 12). College attenders will be compared with non-attenders on a variety of behavioral, motivational and situational variables. Preliminary results indicate that only about six per cent of the boys and about 13 per cent of the girls who took the NMSQT in 1961 do not plan to attend college. (In progress)

15. A Study of the Effects of Scholarships. Of the 1962 Merit Scholars, 176 males and 92 female Finalists were awarded scholarships because they were children of employees of certain corporations or organizations. A control group, selected from Merit Finalists who were not awarded scholarships, was matched with the "employee" Scholars on sex, prospective major field, SAT score, and financial status of the family. These two groups will be followed through the college years as a part of the Personal Development sample (see p. 12). (In progress)

III. Educational Influences

This section summarizes our studies of the college itself. Our goals are to find ways of characterizing colleges, and to learn if colleges affect the student's level of aspiration, his choice of major field, the stability of his choice, etc. Up to this time, our findings about the influence of the college upon the student have been ambiguous, but several studies now in progress promise more explicit results.

The purpose of the first three studies described below was to replicate and extend previous findings which suggested that certain features of the college environment are conducive to the development of motivation to seek advanced training while others are detrimental.

16. Evaluating the Effects of College on the Talented Students. A brief history is given of NMSC's research on the college (5). (Completed)

17. "Productivity" of Undergraduate Institutions. A new method of evaluating the "Ph.D. productivity" of undergraduate institutions was applied to a sample of 265 institutions. It was found that a college's actual Ph.D. output (i.e., the proportion of its bachelor's degree recipients who later obtain Ph.D.'s) can be predicted fairly accurately from an "expected" Ph.D. output based on the sex, major fields, and intelligence level of its students. Correlations between expected and actual Ph.D. outputs ranged from .62 (for coeducational universities) to .98 (for technological institutions). The correlation between expected and actual outputs for the entire sample of 265 institutions was .85.

Public institutions were found to be significantly more productive than private institutions, and men's institutions, especially those located in the northeastern states, were found to be underproductive significantly more often than other institutions. Previous findings (see ref. 59) which indicated that the faculty influences a college's Ph.D. productivity were not confirmed. (1) (Completed)

18. An Empirical Characterization of Higher Educational Institutions. The purpose of this study was to determine, by means of a factor analysis of major institutional characteristics, the principal dimensions along which higher educational institutions differ. The 33 variables selected for study included measures of the students, faculty, college "climate," financial resources, and institutional "type." A principal components factor analysis of these variables was performed on a sample of 335 colleges and universities. Similar analyses were also performed separately on five subgroups: public institutions, private institutions, universities, liberal arts colleges, and men's colleges.

Six identifiable factors emerged from the total analysis: Affluence (wealth"), Size, Private versus Public Control, Masculinity versus Femininity, Realistic (technical) Emphasis, and Homogeneity of the Environment. The five subgroup analyses revealed similar factors, in addition to a factor identified as Intellectual (Scholarly) Orientation. Affluence--which includes an institution's financial resources, the intelligence of its students, the training of its faculty, and characteristics of its environment-- accounted in each analysis for about twice as much variance as any other single factor. (4) (Completed)

19. Further Validation of the Environmental Assessment Technique (EAT). An attempt was made to test specific interpretations of the EAT variables by administering eighteen items dealing with aspects of the college environment to a sample of 4,500 high aptitude students at the time of their graduation from 76 different colleges in 1961. The students' perceptions of the effects of their four years of college were elicited by 20 additional items.

Mean scores on each of the 38 items were computed separately for each college and then correlated with the eight EAT variables. Preliminary results tend to confirm the earlier interpretations of the EAT. For example, the intelligence level of the student body correlates .74 with the item, "The quality of teaching and instruction is markedly superior to that of the average institution." Perceived

effects of college also tend to correlate in expected ways; e.g. the Artistic Orientation correlates .59 with "increased interest in art and music." (In progress)

20. Behavioral Studies of the College Environment. In the summer of 1962, questionnaires were sent to random samples of the freshman classes who had entered 248 colleges in the fall of 1961. Approximately 200 students at each institution were polled to obtain: (a) a record of each student's activities, achievements, and other behavior at college; and (b) a comprehensive report of each student's impressions of the college and the college environment. Norms on each kind of behavior will be computed for each college and intercorrelated across the 248 institutions. Factor analytic methods will be used to identify the major behavioral dimensions which differentiate institutions. The student's impressions of the environment will be similarly studied and the results compared with the results of the analysis of behavior. It is hoped that these studies will eventually help us to identify the salient features of different college environments. (In progress)

21. A Study of Student "Input" at Institutions of Higher Learning. In the fall of 1961, the freshman classes entering 248 representative colleges and universities were surveyed to obtain a variety of data which would indicate each student's potential for later achievement. Information was collected on the student's socioeconomic status, choice of major field and future occupation, high school grades, and outstanding achievements as measured by a list of achievements which previous research had shown to be a good index of creativity. The study has two goals. The first is to determine the distribution of students among different types of colleges with respect to their socioeconomic backgrounds, past achievements, and future plans. The results of these analyses should increase our knowledge about the distribution of student talent; they should also provide information about the factors which affect the student's choice of college. The second goal is to determine how the types of students admitted to an institution are

related to its organizational structure and environment. Factor analyses of the student input data (which will include representative variables from the EAT and from earlier factor analyses of institutions) will be performed. (In progress)

22. Effects of Different College Environments on the Motivation of Talented Students to Pursue Careers in Science. The purpose of this project is to determine those aspects of the college environment which affect the talented student's motivation to pursue a career either in scientific research or in teaching science at the college level. (In progress)

23. "Influences" on the Student's Motivation to Seek Advanced Training: Another Look. In a previous study, the student's motivation to seek advanced training was attributed to the influence of certain college "presses." This study re-examined these results. In particular, the use of retrospective reports and of the analysis of covariance in studying environmental effects was questioned. New analyses failed to support the earlier conclusions about the effects of the college "press" on motivation. (6) (Completed)

24. Differential College Effects on the Motivation of Talented Students to Obtain the Ph.D. This project is an attempt to assess differential college effects on the student's motivation to obtain the Ph.D. degree by employing an input-output design to control a variety of student input variables. Preliminary results indicate that colleges differ markedly in the way they affect the student's plans to obtain the Ph.D. degree. (In progress)

25. College Effects on Student Achievement. The relationship between various characteristics of the college and residual student achievement in various areas is being studied, using the subjects from the 1960 assessment (see p. 4). Differences which exist between students before they entered college have been controlled by multiple regression. Preliminary results suggest that achievement in science is positively related to college size and negatively related to percentage of males on campus. (In progress)

IV. Personal Development

This year, with the addition of Dr. Robert C. Nichols to the staff, we have started to study personal stability, mental illness, and related developmental problems. We hope to learn how the student's personality is changed by his college experiences, and whether or not specific college experiences are conducive to personal stability, effectiveness, etc.

Two studies in this area have been initiated; a third will be started in 1963.

26. 1958 Follow-up. The sample of Merit Finalists assessed in 1958 when they were high school graduates was reassessed as college graduates in 1962. Two tests (the Sixteen Personality Factor Questionnaire and the Vocational Preference Inventory) were re-administered and other measures of personality and mental health were obtained. The same measures were obtained also from all 1958 Merit Scholars and from a sample selected at random from the senior class of 42 colleges. (In progress)

27. 1962 Personal Development. A sample of Merit Finalists who graduated from high school in 1962 and a random sample of students who took the NMSQT at the same time are being assessed with an extensive questionnaire covering attitudes, interests, current personality and behavior, early life development, and ratings by peers and teachers. These data will serve as initial measures for a longitudinal study during the college years. Personality changes will be studied in relation to the college environment and to the individual experiences of the student. (In progress)

28. Twin Study. A study of the genetic factors which affect ability, achievement and personality is being planned. If possible, we hope to obtain from the 1962 administration of the NMSQT a sample of 1,000 sets of twins, who will then be assessed with a variety of ability, achievement, and personality measures. They will be followed longitudinally during their college years. (In progress)

V. Vocational Goals: Their Origins and Development in the High School and College Years

This group of studies is intended to discover the ways in which the student selects vocational goals, the personal and impersonal origins of his choice, the collegiate experiences which affect his goals, and the nature of his career after college. We hope also to develop a theory of vocational goals which will organize this knowledge. Studies of post-college vocational achievement will be integrated with the identification studies.

The studies so far completed stem largely from two previous reports: the rationale of an inventory of occupational titles developed to measure personality, and a theory of vocational choice. The ideas in these preliminary reports have led to a series of studies of vocational preference, choice of occupation and major field, and the relation of the student's vocational goals to his aptitudes, personality, potential for creativity, self-evaluation, his parents' values and attitudes, etc.

29. Explorations of a Theory of Vocational Choice and Achievement: II. A Four-Year Prediction Study. This report is the second of several studies undertaken to explore a theory of vocational choice and personality types by testing and elaborating some of its hypotheses (13). The first report in this series was a longitudinal study of two samples of high-aptitude students over one-and two-year periods (45). This second study is a four-year longitudinal study of the vocational choice and achievement of a single high-aptitude sample.

The theory was extended by describing environments (colleges in this instance) in the same terms (the degree to which a college resembles each of six model orientations) that were used to describe students. The Environmental Assessment Technique (EAT) was used for this purpose. This coding of colleges and of students made possible the study of achievement (in leadership, science, and the arts) and

of stability of vocational choice and major field for different kinds of students in different kinds of colleges.

In general the results support the hypotheses tested. The results, and some incidental findings, are summarized in the following paragraphs.

(1) Students with different dominant personal orientations--as defined by their high-point scale from the Strong Vocational Interest Blank (SVIB)--have significantly different attributes, including scholastic aptitude, self-concepts (as assessed by self-ratings), personal traits, originality, daydreams, college majors, career choices, preferred roles, and achievements.

(2) The attributes of students with a given dominant personal orientation generally correspond to the attributes hypothesized for the corresponding model orientation. However, because the model orientations in the original statement of the theory are not fully formulated, no precise tests of these relationships were made.

(3) The "direction of vocational choice" is significantly related to the appropriate personal orientations in accordance with the theory.

(4) Stability of major field and vocational choice is associated with the Realistic and Intellectual types; instability is associated with the other four types.

(5) When the student and the college he attends are congruent (that is, when both have the same code, and thus similar orientations), it is more likely that the student will have outstanding achievements and that his choice of field and of vocation will remain stable.

(6) A consistent college environment (that is an environment dominated by orientations which are compatible in a psychological sense) is positively related to stability and, in a few instances, to achievement.

(7) Institutions in which students tend to change fields are characterized by heterogeneity (EAT), inconsistency (EAT), large percentages of students of the Enterprising type, and low percentages of Ph.D. degree holders on the faculty.

(8) Students tend to move away from fields in which they are dissimilar to the typical student and toward fields in which they are similar to the typical student.

(9) Stability and achievement are related to both personal and institutional attributes, but they are more closely related to personal attributes.

(10) The student's expressed choice of major field or vocation at the time he enters college is a more efficient predictor of his choice at graduation than any other personal or situational variable. (Completed)

30. The Meaning of Interests. This paper suggests one useful interpretation of the term "vocational interests." It traces the history of definitional problems and indicates some of the consequences of the failure to develop useful definitions. (14) (Completed)

31. Explorations of a Theory of Vocational Choice: III-IV-V. The 1960, 1961, and 1962 assessments were planned so that additional studies of choice of major field and vocation could be performed. Studies III and IV are being processed now. Study V is in the data collection stage. (In progress)

VI. Miscellaneous Methodological, Descriptive, and Editorial Reports

Our chief emphasis is on studies central to the main objectives of the Corporation and the research program--for instance, the identification of talent, college environments, and talent loss. But whenever practicable, we will continue to study various special problems, since such studies provide information about talented youth which is of general scientific and educational interest.

32. A Note on the MMPI Psychopathic Deviate Scale. A previous article reporting a factor analysis of the MMPI Pd Scale was discussed. Suggestions were made for reinterpreting some of the findings. (3) (Completed)

32. "Bad Habits" and Social Deviation: A Proposed Revision in Conflict Theory. N. E. Miller's approach-avoidance conflict model was discussed in terms of the type of conflict associated with "bad habits" (e.g. smoking and overeating) and socially deviant behavior. It was suggested that such conflicts do not conform to the principle of a steeper avoidance gradient. Consequently, it was proposed that the steepness of any gradient varies directly with the temporal contiguity of the behavior and the reinforcement. Data obtained from hospitalized narcotic drug addicts supported this proposed revision in conflict theory. (2) (Completed)

34. Major Programs of Research on Vocational Behavior. This report is a chapter written for the book Man in a World of Work, sponsored by the APGA, Henry Borow, editor. (12) (Completed)

35. A Program of Research on Talented Students. This report was prepared to provide a brief general account of our research program. It is a non-technical description of our studies and contains a bibliography classified by area of research. (15) (Completed)

36. A Factor Analysis of the CPI. Because the California Psychological Inventory (CPI) has been used in two of our assessments, a factor analysis of the 18 scales was carried out. Factor scales were constructed to measure the two major factors. Correlates of these scales suggest that they are measuring the familiar second-order factors of Neuroticism and Extroversion-Introversion. (17) (Completed)

Research Staff

The following persons were employed on the research staff during the period covered in this report:

Name	Title	Period of Employment	% of Time
John L. Holland	Director of Research	7-1-61 - 6-30-62	100
Alexander W. Astin	Research Associate	7-1-61 - 6-30-62	100
Robert C. Nichols	Research Associate	8-15-61 - 6-30-62	100
F. Suzanne Brua	Secretary	7-1-61 - 12-31-61	100
Catherine J. Brant	Secretary	1-8-62 - 6-30-62	100
Virginia O. Chalmers	Secretary	7-1-61 - 6-30-62	100
Hazel E. Clifford	Secretary	7-1-61 - 8-31-61	100
Hope M. Krupnick	Secretary	9-12-61 - 6-30-62	100
Annette G. Ahlman	Research Assistant	10-1-61 - 6-30-62	55
Nancy D. Bailey	Research Assistant	7-1-61 - 12-31-61	100
Linda J. Brule	Research Assistant	4-15-62 - 6-30-62	100
Rex L. Hanks Jr.	Research Assistant	9-1-61 - 1-31-62	100
Suzanne L. Krantz	Research Assistant	6-11-62 - 6-30-62	100
Patricia S. O'Donnell	Research Assistant	10-1-61 - 3-31-62	75
Thaddeus J. Rutter	Research Assistant	1-5-62 - 6-15-62	75
Annie M. Watkins	Research Assistant	7-1-61 - 9-30-61	100

References for Papers Completed during the Period

July 1, 1961 through June 30, 1962

1. Astin, A. W. "Productivity" of undergraduate institutions. Science, 1962, 136, 129-135.

2. ------. "Bad habits" and social deviation: a proposed revision in conflict theory. J. clin. Psychol., 1962, 18, 227-231.

3. ------. A note on the MMPI psychopathic deviate scale. Educ. psychol. Measmt., 1961, 21, 895-897.

4. ------. An empirical characterization of higher educational institutions. J. educ. Psychol., in press.

5. ------. Evaluating the effects of college on the talented student. American Mathematical Monthly, in press.

6. ------. Influences on the student's motivation to seek advanced training: another look. J. educ. Psychol., in press.

7. ------. A note on the relationship between creative and academic achievement. Evanston, Ill.: National Merit Scholarship Corp., 1962. (Mimeo)

8. ------. Further validation of the Environmental Assessment Technique (EAT). Paper presented at AERA meetings, Atlantic City, 1962.*

9. Holland, J. L. The National Merit research program. Education, 1962, 82, 477-481. Also appeared in School and Society, 1962, 90, 199-202.*

10. ------. The nature of student achievement: a summary and model for research and practice. In Creativity: its assessment and measurement. Los Angeles: Educational Testing Service, 1962 (Summaries of this paper were presented at meetings of the National Association for the Gifted Child and the Western Regional Conference on Testing Problems, 1962.)*

11. ------. The assessment and prediction of the creative performance of high aptitude youth. Paper presented at the Fourth University of Utah Research Conference on the Identification of Creative Scientific Talent. Salt Lake City, 1962.*

12. ------. Major programs of research on vocational behavior. A chapter for the APGA book, Man in a World of Work, Henry Borow, editor.*

13. ------. Explorations of a theory of vocational choice and achievement: II. A four-year prediction study. Evanston, Ill.: National Merit Scholarship Corp., 1962.*

14. ------. The meaning of "interests." Paper presented at APGA Convention, Chicago, 1962.*

15. ------, Astin, A. W., & Nichols, R. C. A research program on talented students. J. College Student Personnel, in press.

16. Nichols, R. C. A comparison of National Merit Finalists with the average student at college graduation. Evanston, Ill.: National Merit Scholarship Corp., 1962. (Mimeo)*

17. ------, & Schnell, R. R. Factor scales for the California Psychological Inventory. Evanston, Ill.: National Merit Scholarship Corp., 1962. (Mimeo)

18. Taylor, C. W. & Holland, J. L. Development and application of tests of creativity. Review of Educational Research, 1962, 32, 91-102.*

References for Reports Completed during the period
January 1, 1957 through June, 1961

19. Astin, A. W. A reexamination of college productivity. J. educ. Psychol., 1961, 52, 173-178.

20. ------. Criterion-centered research. Evanston, Ill.: National Merit Scholarship Corp., 1961. (Mimeo)

21. ------, & Holland, J. L. The environmental assessment technique: a way to measure college environments. J. educ. Psychol., 1961, 52, 308-316.

22. ------. The distribution of "wealth" in higher education. College and University, 1962, 37, 113-125.

23. Holland, J. L. Undergraduate origins of American scientists. Science, 1957, 126, 433-437.

24. ------. Student explanations of college choice and their relation to college popularity, college productivity, and sex differences. College and University, 1958, 33, 313-320.*

25. ------. A note on the reliability and validity of the Minnesota Scale for Parental Occupations as an estimate of family economic status. J. appl. Psychol., 1958, 42, 195-196.*

26. ------. The prediction of scholastic success from a high aptitude sample. School and Society, 1958, 86, 290-293.*

27. ------. A personality inventory employing occupational titles. J. appl. Psychol., 1958, 42, 336-342.*

28. ------. Parental expectations and attitudes about colleges. College and University, 1959, 34, 164-170.*

29. ------. A theory of vocational choice. J. counsel. Psychol., 1959, 6, 35-45.*

30. ------, Determinants of college choice. College and University, 1959, 35, 11-28.

31. ------. A classification for occupations in terms of personality and intelligence. Amer. Psychologist, 1959, 14, 376. (Abstract)*

32. ------. The undergraduate achievement of National Merit Scholars and Certificate of Merit winners. The Bulletin of the National Association of Secondary School Principals, 1959, 43, 190-192.

33. ------. Some limitations of teacher ratings as predictors of creativity. J. educ. Psychol., 1959, 50, 219-223.*

34. ------. The prediction of college grades from the California Psychological Inventory and Scholastic Aptitude Test. J. educ. Psychol., 1959, 50, 135-142.*

35. ------. The relation of the Vocational Preference Inventory to the Sixteen Personality Factor Questionnaire. J. appl. Psychol., 1960, 44, 291-296.*

36. ------. National Merit Scholars and the problem of identification. Paper presented at American Personnel and Guidance Association meeting, 1959.*

37. ------. The achievement, aptitudes, and personalities of National Merit Scholars and Certificate of Merit winners. The Bulletin of the National Association of Secondary School Principals, 1960, 44, 100-104.

38. ------. The prediction of college grades from personality and aptitude variables. J. educ. Psychol., 1960, 51, 245-254.

39. ------. A comparison of National Merit Scholars and Certificate of Merit winners. The Bulletin of the National Association of Secondary School Principals, 1960, 44, 140-142.

40. ------. Creative and academic performance among talented adolescents. J. educ. Psychol., 1961, 52, 136-147.

41. ------. Research on honors: a response to the MacLeod-Heist proposals. The Superior Student, 1960, 3, 7-8.*

42. ------. Achievement syndromes among high aptitude students. Psychological Reports, 1961, 8, 384.*

43. ------. Dangers in our scholarship policies. Teachers College Record, 1961, 62, 326-328.*

44. ------. Some explorations with occupational titles. J. counsel. Psychol., 1961, 8, 82-87.*

45. ------. Some explorations of a theory of vocational choice: I. One- and two-year longitudinal studies. Psychol. Monogr., in press.

46. ------, & Stalnaker, J. M. An honorary scholastic award. J. Higher Educ., 1957, 28, 361-368.

47. ------ & Stalnaker, Ruth C. A descriptive study of talented high school seniors: National Merit Scholars. The Bulletin of the National Association of Secondary School Principals, 1958, 42, 9-21.*

48. ------ & Kent, Laura. The concentration of scholarship funds and its implications for education. College and University, 1960, 35, 471-483.

49. ------ & Astin, A. W. The need for redefining "talent" and "talent loss": a plan for practical action and research. J. Higher Educ., 1962, 33, 77-82.

50. ------. The prediction of academic, artistic, scientific, and social achievement of undergraduates of superior scholastic aptitude. J. educ. Psychol., 1962, 53, 132-143.

51. Stalnaker, J. M. Principals evaluate the National Merit Scholarship program. The Bulletin of the National Association of Secondary School Principals, 1958, 42, 22-24.

52. Thistlethwaite, D. L. Scholarships and the college-going behavior of talented students. College and University, 1958, 34, 65-73.

53. ------. How the talented student evaluates his high school. School Review, 1958, 66, 164-168.

54. ------. The conservation of intellectual talent. Science, 1958, 128, 822-826.*

55. ------. College scholarship offers and the enrollment of talented students. J. Higher Educ., 1958, 29, 421-425.

56. ------. Counseling high-aptitude students on scholarship opportunities. Personnel and Guidance Journal, 1959, 37, 574-577.

57. ------. Merit scholarships and the higher education of gifted students. J. Higher Educ., 1959, 30, 295-304.*

58. ------. Effects of social recognition upon the educational motivation of talented youth. J. educ. Psychol., 1959, 50, 111-116.

59. ------. College environments and the development of talent. Science, 1959, 130, 71-76.*

60. ------. College press and student achievement. J. educ. Psychol., 1959, 50, 183-191.

61. ------. The college environment as a determinant of research potentiality. In C. W. Taylor (ed.) The Third (1959) University of Utah Research Conference on the Identification of Creative Scientific Talent. Salt Lake City: Univer. of Utah Press, 1959, Pp. 213-231.*

62. ------. Review of The Gifted Group at Mid-Life by Lewis M. Terman and Melita H. Oden. Science, 1959, 130, 328-329.*

63. ------. Social characteristics of universities and colleges in relation to their intellectual output. Paper prepared for the Fourth World Congress of Sociology, Milan, Italy, 1959.*

64. ------. The conservation of human talent. Paper presented at the American Personnel and Guidance Association meeting, Cleveland, 1959.*

65. ------. College press and changes in the study plans of talented students. J. educ. Psychol., 1960, 51, 222-234.

66. ------. The recognition of excellence. College and University, 1961, 36, 282-295.

67. ------. Recruitment and retention of talented college students. Paper presented at meetings of the AAAS, New York, December, 1960.*

68. ------. Honors programs and motivation to seek advanced training. The Superior Student, 1961, 4, 16-19.*

69. ------ & Campbell, D. T. Regression-discontinuity analysis--an alternative to the ex post facto experiment. J. educ. Psychol., 1960, 51, 309-317.

70. Technical Report No. 1. National Merit Scholarship Corp., December, 1957.*

71. ------ No. 2. National Merit Scholarship Corp., September, 1958.

72. ------ No. 3. National Merit Scholarship Corp., June, 1959.*

73. ------ No. 4. National Merit Scholarship Corp., June, 1960.*

74. ------ No. 5. National Merit Scholarship Corp., June, 1961.*

* Reports or reprints not available.